

# ATTRIBUTES OF WINE ASSESSMENT

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## Abstract

*The quality of wine is examined by two systems: sensory and analytical. The main components in wine are finding out by chemical analysis: alcohol, extract, residual sugar, acids. The actual quality of wine, whether it is at all suitable for consumption, can only be found out by a sense-sensory assessment of a person - a taster. In the work we will deal with the assessment of wine according to the basic characteristics of the wine, namely colour, smell and taste. From these three characteristics, all other wine assessment systems will be developed, taking into account the weight of each factor. In the work we will also deal with individual types of wine and comparison of the quality of individual wines.*

**Keywords:** Analytical system, Aroma of wine, Colour, Sensory system, Taste, Wine

**JEL Classification:** M30, M39

## 1 Introduction

The quality of wine is examined by two systems: sensory and analytical. Sensory analysis of wine is expensive and time consuming. Alternatives to characterize aspects of wine flavour and aroma are thus highly desirable.

The main components in wine are identified by chemical analysis: alcohol, extract, residual sugar, acids. Other substances contained in wine, such as aroma and taste substances, foreign substances, tannins, glycerol, colorants and others, are detected only when needed.

The chemical composition of any wine sample contains numerous small molecules largely derived from three different sources: the grape berry, the yeast strain used for fermentation and the containers used for wine making and storage. The combined sum of these small molecules present in the wine, therefore, might account for all wine specific features, such as cultivar, vintage, origin and quality.

Still, most wine authentication procedures rely either on subjective human measures or if they are based on measurable features, they include a limited number of compounds (Inostroza et al., 2010, p. 3573).

Forde et al. (2011, p. 2573) argue that the sensory properties of wine are influenced by the chemical composition of the grapes used to produce them. Identification of grape and wine chemical markers associated with the attributes perceived by the consumer of the wine will enable better prediction of the potential of a parcel of grapes to produce wine of a certain flavour.

The actual quality of wine, whether it is at all suitable for consumption, can only be identified by a sense-sensory assessment of a person - a taster.

This assessment will show us not only the quality of wines, but also their possible shortcomings, diseases or defects of wine that we could not correctly characterize in different way.

In the work we will deal with the assessment of wine according to the basic attributes of the wine, namely clarity, colour, aroma and taste. From these four attributes, all other wine assessment systems will be developed, taking into account the weight of each factor.

When assessing the whole series of wine samples, as it is practiced in quality inspections, it is easier to express different levels of quality. The differences in quality are marked by points in order to compare the results of the evaluation better. For this, a number of systems have been developed with the use of various point schemes.

## **2 Data and Methods**

Sensory assessment of individual quality attributes is the evaluation of wine quality through individual sensory categories. Typically, a 100-point rating system approved by the International organization for grapevine and wine is used. The evaluation is anonymous. The assessor knows almost nothing about the wine he tastes. He is acquainted only with the vintage and category of wine. All other wine facts are strictly classified.

### **2.1 Clarity and purity of wine**

Consumers have become habituated to perfectly clear wines. Considerable effort is expended in producing wines stable in terms of clarity.

A completely clear wine is a wine without any turbidity. Sparkling or lightning wines are wines, which are ripe and healthy. We assess the clarity of wine after it has been poured into dry and well-cleaned glasses. When assessing the purity, the

wine can be characterized as crystalline pure, with lightning, sparkling, clean with a weak veil (hazy), dull, opalescent, cloudy or very cloudy (Mráz, 2005).

## **2.2 Colour of wine**

The visual attributes of wine depend on how its chemical and particulate matter transmit, absorb and reflect visible radiation. Although some of these attributes can be accurately measured with a spectrophotometer, the relevance of the data obtained to human colour perception is far from direct. White wines are characterized by various shades from very bright, greenish, yellow-green to amber – yellow and various shades of brown. The condition and the character of the wine can be determined according to the colour. Typical shades for red wine are bright red, brick-red, ruby - coloured, flame-red and dark red. The old wine is characterized by the brownish-red colour (Elsevier, 2014).

The color of wine is also affected by the age of wine. As time passes, white wines change a colour to dark. The cooler the climate is, the sourer and lighter the white wines become. On the other hand, red wines are becoming lighter with aging. Overall, the colour tells us the age of wine, the origin and the variety.

## **2.3 Wine aroma, bouquet**

Smelling wine is one of the most important characteristics by assessment of the quality of wine. It is constituted by volatile substances. Therefore it is important to assess the wine by temperature, when the volatile substances vaporize by the same conditions. Wine aroma has to be mainly pure, characteristic for grapevine, even if it is a consumer wine which does not have the characteristics of quality wine. The aroma of high-quality wine has to be up to the character of the variety or to the type of the branded wine.

An unclean aroma with a hint of vinegar implies the beginning of wine acetic acid fermentation or other bacterial, unclean fermentation of wine. The unclean aroma with foreign smells hints that the wine has come into contact with the substances that transmit these smells to it. In this case, we are speaking about defects of wines (Sirén et al., 2015).

The aroma is the natural attribute of wine that we perceive with more senses. The distinction and identification of the aroma is a matter of practice and experience. Aroma identification is one of the basic aspects of tasting, which aims to create an image about the character of wine. We can create various interesting combinations and creations for wine characterization.

A very important attribute of wine is its intensity. Depending on the age, variety or quality of wine, it may vary for each wine. It is therefore very important to emphasize this attribute of wine as well.

## **2.4 Taste of wine**

The taste of wine is composed of the complex of substances and individual components of this complex are sensed by receptors of taste. The receptors are situated on various parts of the tongue. Therefore it is important to use the whole surface of the tongue. During tasting, the wine has to move along the tongue so that the whole oral cavity will fill up and all receptors of taste will be used. The taste of wine has to be pure, without secondary flavours and harmonious. It means, that the individual components cannot stand out. If these components, such as alcohol or acids stand out, the wine is inharmonious and of low-quality. Acid content is very important for the taste of wine. Natural wine with a low acid content is soft, dull, indistinct and shows excessive acid degradation or wine deacidification (Gawel, Godden, 2008).

The taste of wine is, in many ways, the most important and most dominant wine attribute. Especially for laic and occasional wine consumers. Taste is impressive, but at the same time, it is a source of experience and enjoyment. The longer the enjoyment is, the better and more quality the wine is. By taste we assess the basic parameters of wine, such as sweetness, acidity, bitterness, or salinity. The acidity of wine is lost with age, but it adds freshness and sharpness. However, some experts claim that with age, acidity reaches the correct and optimal level.

When examining the taste of wine, another parameter is very important, namely the fullness of wine, which determines its character. The main aspect of the fullness of wine is alcohol. This is a major aspect, but by far not the only one. Wines with high alcohol content are full and heavy. Therefore, it is very important for wine, to achieve a balance in terms of sugar, alcohol, acidity and sweetness.

## **2.5 Total characteristics of wine**

After objective assessment of influence of individual wine components, it is necessary to assess the total characteristics of wine which is given by the combination of these components and their mutual influence. And then it indicates the real quality of wines. According to the total characteristics, wines are called by special terms.

For dessert and spiced wines, the clarity, aroma, taste and total characteristics of wines are assessed, as well as for natural wines, but with taking into account the specific character of these wines. Since these wines are branded, we cannot simply

compare various types. By their assessment, we can only focus on memory, if we drank them earlier, or we can only state the quality we perceive. In other words, to see if they meet the required quality requirements (WEBASE, 2011).

## 2.6 Procedure for assessing wine quality

By sensory assessment we assess wines subjectively. We assess the quality, perhaps even faults and deficiencies of the wine. Samples are offered anonymous in the prescribed order and they are assessed according to charts. However, if we do not know the characteristics of individual varieties or branded wines, we cannot safely determine whether the assessed wine corresponds to the wine declared. This can only be determined when several wines are assessed at the same time when the quality of wines is compared with each other. The same procedure is performed in wine quality inspections, in wine quality competitions at exhibitions or by controlling the quality of wines produced in enterprises.

The qualities of wines are characterized by short descriptions and by the number of points which presents grades of quality. Most often used are 20 or 100 – points charts.

Table 1 Wine rating scheme in 100 points

		White wine	Red wine
<b>Appearance</b>	<b>quite</b>	0 – 8	0 – 8
	cloudy	0 – 1	0 – 1
	clear	2 – 5	2 – 5
	sparkling	6 – 8	6 – 8
<b>Colour</b>	<b>quite</b>	0 – 12	0 – 20
	unsuitable	0 – 3	0 – 4
	weak	4 – 6	5 – 10
	good	7 – 9	11 – 15
	full-bodied	10 – 12	16 – 20
<b>Aroma</b>	<b>quite</b>	0 – 20	0 – 12
	unsuitable	0 – 3	0 – 2
	weak	4 – 8	3 – 5
	moderate	9 – 15	6 – 9
	excellent	16 – 20	10 – 12
<b>Taste</b>	<b>quite</b>	0 – 40	0 – 40
	unsuitable	0 – 3	0 – 3

		<b>White wine</b>	<b>Red wine</b>
	empty	4 – 11	4 – 11
	good	12 – 21	12 – 21
	very good	22 – 29	22 – 29
	excellent	30 – 40	30 – 40
<b>Overall impression</b>	<b>quite</b>	0 – 20	0 – 20
	unsatisfactory	0 – 1	0 – 1
	sufficient	2 – 4	2 – 4
	satisfactory	5 – 9	5 – 9
	good	9 – 12	9 – 12
	very good	13 – 16	13 – 16
	excellent	17 – 20	17 – 20
	<b>Total</b>	<b>100 points</b>	

Source: CORNER.SK, 2008. Available at: <http://wineplanet.sk/pomoc/hodnotenie-vin>.

Table 2 Wine rating scheme in 20 points

<b>Colour 0 – 2 points</b>	
quite unsuitable, brownish	0 – 0,5
less suitable marking (old)	0,6 – 1,5
suitable marking (vintage, variety)	1,6 – 2,0
<b>Purity 0 – 2 points</b>	
cloudy with sediment	0 – 0,5
slightly cloudy	0,6 – 0,9
clean with tiny particles at the bottom	1,0 – 1,4
clear	1,5 – 1,8
clear with sparkle	1,9 – 2,0
<b>Aroma 0 – 4 points</b>	
foreign, quite unsuitable	0 – 0,5
indistinct, foreign, after volatile acids	0,6 – 1,5

<b>Colour 0 – 2 points</b>	
<b>less suitable, less clean</b>	1,6 – 2,0
<b>weak but clean</b>	2,1 – 2,5
<b>suitable, clean, nice</b>	2,6 – 3,5
<b>fully suitable, distinct</b>	3,6 – 4,0
<b>Taste 0 – 12 points</b>	
<b>foreign, quite unsuitable</b>	0 – 2,0
<b>less clean, after volatile acids</b>	2,1 – 4,0
<b>less suitable, rough</b>	4,1 – 6,0
<b>empty, neutral</b>	6,1 – 8,0
<b>suitable marking, nice</b>	8,1 – 10,0
<b>Fully suitable marking, distinct</b>	10,1 – 12,0

Source: CORNER.SK, 2008. Available at: <http://wineplanet.sk/pomoc/hodnotenie-vin>.

## 2.7 Conditions for sensory assessment

Sensory assessment is a cornerstone of wine assessment process. For sensory assessment of wine attributes, some conditions need to be fulfilled.

In the professional evaluation of wine quality, almost all sense organs are involved. We evaluate the appearance and colour of the wine visually, thermal and pressure feelings in the oral cavity we record by touch and with the sense of smell, we evaluate the intensity and quality of volatile aromatic substances.

### 2.7.1 Environmental requirements

The room where the wines are evaluated should be airy, clean, well ventilated and protected from noise, which could distract the taster. Room temperature should be 18 ° C. With falling temperature, feelings are reduced because volatile aromatic substances remain in the wine closed. Clean and dry, thin-walled and uncut wine glasses from colourless glass are used for tasting. This also requires a white background. Drinking water and pieces of bread should be available to neutralize taste buds between the assessments of individual wines. For easier assessment of wine clarity, light should be available to transilluminate the wine in a glass. The candle light is most commonly used (Leeschaeve, 2007).

When assessing, the glasses are filled to the third of their content. After tasting, we pour off the residue of the wine. Then we rinse the glass with clean water and wine, which we are going to taste, so that the taste of the previous wine cannot influence the assessment of the next sample. Tasting should be held in the early afternoon around 10 a.m. when the taster has "clean palate", that is, sometime after breakfast and before lunch when taste buds are the most active (Leeschaeve, 2007).

### **2.7.2 Wine preparation**

In the preparation of wines, sorting out wine samples according to their characteristics before assessment is very important, so that the assessed wine is always less distinct than the following wine. Therefore, white wines are assessed before pink and red, dry wines before sweeter wines and consumer wines before quality wines. We sort them out according to the intensity of their bouquet and fullness. On some occasions, wines produced from aromatic varieties and from non-aromatic varieties are evaluated separately. When evaluating different types of wine, natural wines are assessed first, then sparkling, dessert and spiced. The temperature of assessed white, pink and dessert wines should be 10 to 14 ° C, for red wines, 15 to 20 ° C. Too many of assessed wines are dulling senses, so it is necessary to make a small break after the assessment of a certain number of samples. Optimal number of samples is 10. After several samples, the palate is tired (Mallet et al.,1999).

For each taster, there are different results of the evaluation, which are influenced by his ability to perceive the aroma and taste, habits, momentary indisposition or disposition and experience, so the results can be very individual. These shortcomings are compensated by the expertise of tasters who know well wine types, they are evaluating. In spite of that, the first two samples are evaluated collectively in order to unify their attitudes and evaluate further samples in this spirit. This procedure is very important because the tasters can underestimate first samples of wines, so without any corrections they could differ considerably from other tasters in their evaluations. In this way, it is possible to completely evaluate the quality of the same types of wines and to choose the best wine in a given range of wines.

## **3 Results and Discussion**

According to Ugliano et al. (2015, p. 205) certain styles of wines are more responsive to oxygen than others, possibly reflecting the key role of specific aroma compounds with lower/higher oxygen sensitivity in their sensory profile. In this

study, 36 wines from different grape varieties were submitted to sensory descriptive analyses. The wines were in an age bracket of 9-19 months (whites), 5-11 months (rosé), 12-48 months (reds). Each wine had received at least two different oxygen exposure levels by means of different closures, with some wines tasted at different time points. In total, 96 wines were tasted. When considering only the contribution of closure-derived oxygen, aroma sensitivity, fruity attributes and reduction were in white wines the sensory descriptors mostly affected by oxygen. In the case of rosé wines, oxygen appeared to influence mainly aroma intensity and the red fruit attributes, whereas for red wines red fruits, cooked fruits and spices were mostly affected. Analyses conducted on selected wines indicated that esters, largely associated with wine fruity aromas were not affected by oxygen.

Only few studies have investigated the impact of vine shading on the sensory attributes of the resultant wine. But the study of Joscelyne et al. in 2007 examined the effects of canopy exposure levels on phenolic composition plus aroma, flavour and mouthfeel aspects in wine. Wines were made from Cabernet Sauvignon and Shiraz grapes (*Vitis vinifera* L.) subjected to different levels of canopy exposure in a commercial vineyard in the Sunraysia region, Victoria, Australia. Canopy exposure treatments included control (standard vineyard practice), exposed (achieved with a foliage wire 600 mm above the top cordon), highly exposed (using a foliage wire with leaf plucking in the fruit zone) and shaded treatment (using 70% shade-cloth). Spectral and descriptive analyses showed that levels of anthocyanins, other phenolics and perceived astringency were lower in wine of exposed and highly exposed fruit. Descriptive analysis also showed that wines from the shaded fruit were different from other treatments for a number of flavour and aroma characters. These findings have implications for vineyard management practices (p. 10888).

Knowledge about the relation between grape and wine phenolics is of key interest for the wine industry with respect to being able to predict wine quality from analyses of grapes. Prediction of the phenolic composition and colour of experimentally produced red wines from the detailed phenolic composition of the corresponding grapes was investigated in the study by Jensen et al. (2008, p. 1105) with the use of multivariate approach. Grape extracts and wines were produced from 55 different grape samples, covering 8 different *Vitis vinifera* cultivars: Alicante, Merlot, Syrah, Cinsault, Grenache, Carignan, Cabernet Sauvignon and Mourvedre. The phenolic composition of the grapes and wines showed that the average ratios between wine and grape phenolics ranged from 0.25 to 7.9 for the different phenolic compounds. Most interestingly, the average ratios were low for anthocyanins (0.31) and tannins (0.32), intermediate for (+)-catechin (0.75) and polymeric pigments (0.98) and high for gallic acid (7.9). Individual wine

phenolics in general correlated well with several grape phenolics, indicating that a multivariate approach might be advantageous for prediction of wine phenolics from grape phenolics analysis.

## 4 Conclusion

Wine as a product has many attributes. In this article we focus mainly on the assessment of wine from two perspectives: sensory and analytical. We deal with four main attributes of wine, such as clarity, colour, aroma and taste. Each attribute has to be analyzed in detail in order to achieve objective results.

When assessing particular attributes of wine, certain conditions, relating to the room in which the wine assessment is carried out, wine samples and people who assess the wine, need to be kept. Not everyone can become a taster. Expert tasters are going through tests that evaluate their ability to recognize the lowest thresholds for individual taste perception. Accordingly, they are also evaluated for their ability and competence to work in the wine quality assessment committees.

The qualities of wines are characterized by short descriptions and by the number of points which presents grades of quality. 20 or 100 – points charts are most often used. It depends on that, if we analyse white wine or red wine. Most often, the colour, aroma, taste, appearance and overall impression are evaluated during the examination.

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